970.1 GENERAL

These specifications apply to bolted and welded construction.

970.2 STRUCTURAL STEEL

Steel shall be furnished according to the following specifications. Unless otherwise specified, structural carbon steel shall be furnished.

A. Carbon Steel: Structural carbon steel for bolted or welded construction shall conform to, AASHTO M270 (ASTM A709) grade 36 (grade 250).

B. Eyebars: Steel for eyebars shall be of a weldable grade. These grades include structural steel conforming to Structural Steel, AASHTO M270 (ASTM A709) grade 36 (grade 250) or AASHTO M270 (ASTM A709) grade 50W (grade 345W) with supplemental requirement S3 of AASHTO M270 grade 50W (grade 345W) mandatory.

C. High-Strength Low-Alloy Structural Steel: High-strength low-alloy structural steel shall conform to AASHTO M270 (ASTM A709) grade 50 (grade 345) or AASHTO M270 (ASTM A709) grade 50W (grade 345W).

D. High-Strength Low-Alloy Structural Steel for Welding: High-strength low-alloy structural steel for welding shall conform to AASHTO M270 Grade 50 (grade 345) with supplementary requirement S3, (ASTM A709 with supplementary requirement S18 of ASTM A6) or AASHTO M270 Grade 50W (grade 345W) with supplementary requirement S3, (ASTM A709 with supplementary requirement S18 of ASTM A6.

E. High-Strength Structural Steel for Bolted Construction: High-strength structural steel for bolted construction shall conform to AASHTO M270 (ASTM A709) grade 50 (grade 345) or AASHTO M270 (ASTM A709) grade 50W (grade 345W).

F. High-Yield-Strength, Quenched and Tempered Alloy Steel Plate: High-yield-strength, quenched and tempered alloy steel plate shall conform to AASHTO M270 (ASTM A709) grades 100 (grade 690) or 100W (grade 690W).

Quenched and tempered alloy steel structural shapes and seamless mechanical tubing, meeting all of the mechanical and chemical requirements of A709 grades 100/100W (grades 345/345W) steel, except that the specified maximum tensile strength may be 140,000 psi (965 MPa) for structural shapes and 145,000 psi (1,000 MPa) for seamless mechanical tubing, shall be considered as A709 grades 100/100W (grades 345/345W) steel.

G. High-Strength Bolts: High-strength bolts shall conform to Section 972.

H. Copper Bearing Steel: Copper bearing steel shall contain not less than 0.2 percent of copper.

I. Welded Stud Shear Connectors: Shear connector studs shall conform to the requirements of Section 7.3, Type B of the latest edition of the ANSI/AASHTO/AWS D1.5 Bridge Welding Code and the following.

Finished studs shall be of uniform quality and condition, free from injurious laps, fins, seams, cracks, twists, bends or other injurious defects. Finish shall be as produced by cold drawing, cold rolling or machining.

The manufacturer shall certify that the studs as delivered are in accordance with the material requirements of this section. Certified copies of in-plant quality control test reports shall be furnished upon request.

The Engineer may select, at the Contractor's expense, studs of each type and size used under the contract, as necessary for checking the requirements of this section.

J. Unfilled Tubular Steel Piles: Unfilled Tubular Steel Piles shall conform to ASTM A252, Grade 2, with chemical requirements meeting ASTM A53, Grade B.

970.3 STEEL FORGINGS AND STEEL SHAFTING

A. Steel Forgings: Steel forgings shall conform to, AASHTO M102 (ASTM A668), Classes C, D, F, or G.

B. Cold Finished Carbon Steel Shafting: Cold finished carbon steel shafting shall conform to, AASHTO M169 (ASTM A108). Grade 1016-1030, inclusive, shall be furnished.

970.4 STEEL CASTINGS

A. Steel Castings for Highway Bridges: Steel castings for use in highway bridge components shall conform to AASHTO M103 (ASTM A27) Class 70 (485) or Grade 70-36 (485-250) of steel, respectively, shall be used.

B. Chromium Alloy-Steel Castings: Chromium alloy-steel castings shall conform to, AASHTO M163 (ASTM A743). Grade CA 15 shall be furnished.

970.5 IRON CASTINGS

Iron castings shall be gray iron conforming to AASHTO M105 (ASTM A48), Class No. 35 (241).

Iron castings shall be true to pattern in form and dimensions, free from pouring faults, sponginess, cracks, blow holes and other defects in positions affecting their strength and value for the service intended. Castings shall be boldly filleted at angles and the arises shall be sharp and perfect.

Castings must be sandblasted or otherwise effectively cleaned of scale and sand so as to present a smooth, clean and uniform surface.

970.6 DUCTILE IRON CASTINGS

Ductile iron castings shall conform to, ASTM A536, Grade 60-40-18. In addition to the specified test coupons, test specimens from parts integral with the castings, such as risers, shall be tested for castings weighing more than 1,000 pounds (450 kg) to determine that the required quality is obtained in the castings in the finished condition.

Iron castings shall be true to pattern in form and dimensions, free from pouring faults, sponginess, cracks, blow holes and other defects in positions affecting their strength and value for the service intended. Castings shall be boldly filleted at angles and the arises shall be sharp and perfect.

Castings must be sandblasted or otherwise effectively cleaned of scale and sand so as to present a smooth, clean and uniform surface.

970.7 MALLEABLE CASTINGS

Malleable castings shall conform to, ASTM A47. Grade No. 35018 (24018) shall be furnished.

Malleable castings shall be true to pattern in form and dimensions, free from pouring faults, sponginess, cracks, blow holes and other defects in positions affecting their strength and value for the service intended. The castings shall be boldly filleted at angles and the arises shall be sharp and perfect.

Castings must be sandblasted or otherwise effectively cleaned of scale and sand so as to present a smooth, clean and uniform surface.

970.8 BRONZE CASTINGS AND COPPER-ALLOY PLATES

A. Bronze Castings: Bronze castings shall conform to, AASHTO M107 (ASTM B22) Alloy 911.

B. Copper-Alloy Plates: Copper-alloy plates shall conform to, AASHTO M108 (ASTM B100) alloy 510 or 511.

970.9 SHEET LEAD

Sheet lead shall conform to, ASTM B29.

970.10 SHEET ZINC

Sheet zinc shall conform to Type II of ASTM B69.

970.11 GALVANIZING

When specified, ferrous metal products shall be galvanized in accordance with, AASHTO M111 (ASTM A123).

970.12 PREFORMED FABRIC PADS

The preformed fabric pads shall be composed of multiple layers of eight-ounce (225 grams) cotton duck impregnated and bound with high-quality natural rubber or of equivalent and equally suitable materials compressed into resilient pads of uniform thickness. The number of plies shall be such as to produce the specified thickness, after compression and vulcanizing. The finished pads shall withstand compression loads perpendicular to the plane of the laminations of not less than 10,000 pounds per square inch (70 MPa) without reduction in thickness or extrusion.

970.13 BRONZE OR COPPER-ALLOY BEARING AND EXPANSION PLATES

The sliding surfaces of these plates shall be finished in the direction of the motion to ANSI B46.1 No. 125. This surface shall be bored on a geometric pattern of recesses and be lubricated with a material suitable for long-life service of the sliding face. The lubricated area shall comprise approximately 25 percent of the bearing face to provide coefficient of friction not to exceed 10 percent for loads of 600 to 1,000 psi (4 to 7 MPa). The edges of the plate shall be chamfered 1/8 inch (3 mm)

A. Bronze Bearing and Expansion Plates: Bronze bearing and expansion plates shall conform to, AASHTO M107 (ASTM B22) Alloy 911.

B. Rolled Copper-Alloy Bearings and Expansion Plates: Rolled copper-alloy bearing and expansion plates shall conform to, AASHTO M108(ASTM B100), Alloy No. 510 or No. 511.